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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/482,769	01/13/2000	Besma Kraiem	450117-02372	7444

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EXAMINER

MUNOZ, GUILLERMO

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 04/13/2004

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/482,769

Applicant(s)

KRAIEM, BESMA

Examiner

Guillermo Munoz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed February 2, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-9 and 11-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-9, and 11-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Arguments

Applicant's response with respect to claim 1 has been considered but is not persuasive.

Applicant's argument—applicant notes that Claim 1 has been amended to include the features of Claim 5, note page 8, line 8 of amendment filed on February 2, 2004.

Examiner's response— Claim 1 as amended does not fully incorporate the limitations of currently cancelled claim 5.

Specifically, claim 5 teaches a correction factor for each subcarrier is determined from the subcarriers QAM symbols whose phase is unique to them, i.e. 8 of the 16 QAM data symbols.

Claim 1 as amended teaches subsequent symbols transmitted on the same subcarrier that are differentially modulated. But, does not teach a correction factor for each subcarrier determined from QAM signals with non-equidistant phases detected on the subcarrier.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over DVB Document A037 "Implementation Guideline For DVB-T Transmission Aspects", in view of Seki et al. (U.S. Patent Number 5,771,224), and Berrou et al. "Digital Television: Hierarchical Channel Coding Using Turbo-Codes".

In regards to claim 1; DVB-T teaches a modulation method and radio communication system wherein:

- “As mentioned above, every subcarrier is modulated by a modulation symbol. QPSK, 16-QAM and 64-QAM are used as modulation methods, e.g. 2, 4, or 6 bits per modulation symbol. The bits are assigned to the particular points in the phase space according to the so called Gray-code mapping”(section 1.1, page 8, 7th paragraph).
- “As described above, three different modulation schemes (signals constellations) are available in the DVB-T specification –QPSK, 16-QAM, and 64-QAM. Any of these signal constellations can be combined with any of five different code rates: $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$ ”(section 1.1.1, page 14, 1st paragraph).

DVB Document A037 teaches that every subcarrier is modulated using a combination of QPSK, 16-QAM or 64-QAM symbols. However, DVB Document A037 does not specifically call for 16-QAM symbols being transmitted with QPSK symbols on a single signal.

Berrou et al., teaches an implementation of the DVB-T system wherein:

- “It is hence interesting to provide a signal that conveys two types of information” (page 1255, section abstract, paragraph 1).
- “The 64QAM is thus regarded as the sum of a QPSK and a 16QAM. However, it remains a regular constellation: this is an important difference between this coding-and-mapping scheme and other systems it could be compared to” (page 1256, section 2.1).

Therefore, it would have been obvious to one having ordinary skill in the art to combine the QPSK and QAM symbols of the DVB-T system into a single subcarrier signal in view of Berrou et al. for the purpose of improving the efficiency of the hierarchical channel coding scheme.

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Furthermore, DVB Document A037 teaches that every subcarrier is modulated using a combination of QPSK, 16-QAM or 64-QAM symbols. However, DVB Document A037 does not specifically call for coherently modulating 16-QAM symbols and non-coherently modulating QPSK symbols.

Seki et al teaches another method of modulating and demodulating a signal having QPSK and QAM symbols wherein:

- “In the differential QPSK method, data is made for transmission to correspond to a phase difference between symbols. At the receiving end, data can be demodulated by the (differential detection). Thus, there is an advantage in that a demodulator used is simple in construction as compared to that for the coherent detection system” (col. 1, line 27-32).
- “On the other hand, the use of the OFDM modulation system for digital television broadcasting needs a high transmission rate. In order to increase the transmission rate, the use of a multi-valued modulation method for each carrier is required. With digital television broadcasting using the OFDM modulation system, a multi-valued QAM method is used as a modulation method for each carrier. With the multi-valued QAM system, however, unlike the above-described differential QPSK method, it is impossible to transmit data in the form of a phase difference between symbols and, at the receiving end, to demodulate data by the differential detection. In order to demodulate multi-valued QAM demodulated signals, seeking the amplitude and phase of each carrier at the receiving end is required. For the multi-valued QAM system, therefore, a method has been proposed by which, at the transmitting end, reference symbols whose amplitude and phase are already known are transmitted periodically and, at the receiving end, the

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reference symbols are used as the reference amplitude and phase in demodulating multi-valued QAM symbols” (col.1, lines 41-60).

- “a multi-valued QAM” (col.1, line 46), anticipating claimed multi-valued QAM of claim 1.

Therefore, it would have been obvious to one having ordinary skill in the art to modulate the hierarchical high priority QPSK stream of DVB-T using a non-coherent modulation circuit and to modulate the hierarchical low priority QAM stream of DVB-T using a coherent modulation circuit in view of Seki et al for the purpose of implementing the modulation of the hierarchical signal in manners well known in the art.

In regards to claim 2; as applied to claim 1 above, Seki et al teaches another method of modulating and demodulating a signal having QPSK and QAM symbols wherein:

- “For the multi-valued QAM system, therefore, a method has been proposed by which, at the transmitting end, reference symbols whose amplitude and phase are already known are transmitted periodically and, at the receiving end, the reference symbols are used as the reference amplitude and phase in demodulating multi-valued QAM symbols” (col.1, lines 55-60).

The reference symbols anticipate claimed coherently transmitted and corrected amplitudes in claim 2.

In regards to claim 3; as applied to claim 2 above, Seki et al teaches another method of modulating and demodulating a signal having QPSK and QAM symbols wherein:

- “a multi-valued QAM method is used as a modulation method for each carrier” (col.1, lines 46-47).

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The multi-valued QAM method used for each carrier anticipates claimed each of the Amplitude distortions due to frequency selectivity are separately corrected per subcarrier in claim 3.

In regards to claim 7; as applied to claim 1 above, Seki et al teaches another method of modulating and demodulating a signal having QPSK and QAM symbols wherein:

- “Effective data other than the reference data is transmitted as 16 QAM symbols” (col.6, lines 31-32), anticipating claimed 16 QAM symbol of claim 7.

Claim Rejections - 35 USC § 112

Claim 8 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 8, the phrase “method for quadrature amplitude modulation (QAM) signals” (line 2), “whereas the phases of respectively subsequent symbols on a same subcarrier are differentially modulated and demodulated, respectively” (lines 5-6), and “running mean of the correction factor is performed over a defined time window” are not enabled by the specification, since the specification states:

“If only 16 QAM signals are available, a running mean of the correcting factors can also be performed over a time window, where the channel is supposed to be static” (page 11, lines 15-17).

It is unclear if a running mean of the correction factor may be performed, since both QAM symbols and differential modulated symbols are present on the signal. Although, the claim does

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not explicitly state the differential modulated signals are not QAM signals, it is inferred, since the specification states:

“The reason why quadrature amplitude modulated (QAM) signals can not be differentially processed as with DQPSK is the multi-amplitude constellation of QAM signals. The result would be endless many amplitude levels after a few symbols have been differentially modulated” (page 10, lines 7-10).

Claims 6, 9, 11, and 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 6, the phrase “QFDM symbols” (claim 6, lines 9), is critical or essential to the practice of the invention, but not defined in the claim(s) and are not enabled by the disclosure. It is suggested the limitations of the phrases “QFDM symbols” be clearly indicated in the claim language.

Regarding claim 9, the variables “m” and “n” (Line 7) are critical or essential to the practice of the invention, but not defined in the claim(s) and are not enabled by the disclosure. It is suggested the limitations of the phrases “m” and “n” be clearly indicated in the claim language.

Regarding claim 11, see claim 9.

Regarding claim 14, the terms “FFT” (line 22), “QPSK” (line 26), and “QAM” (line 26) are critical or essential to the practice of the invention, but not defined in the claim(s) and is not enabled by the disclosure. It is suggested the phrase —FFT— be inserted after the phrase “transformation” in claim 14, line 19; the phrase “QPSK” in claim 14, line 26 be replace with the

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phrase —quadrature phase shift keying (QPSK)— ; the phrase “QAM” in claim 14, line 26 be replaced with the phrase —quadrature amplitude modulated (QAM)— .

Claims 12-13 and 15 is dependent on rejected claims 11 and 14, respectively, and are rejected under 35 U.S.C. 112, second paragraph.

Drawings

New corrected drawings are required in this application because Figure 1 elements 16 and 21 appear to be labeled incorrectly.

Element 16 of figure 1 is labeled “Quadrature Modulator”. The element appears to be a “Quadrature Demodulator” as stated in claim 14, line 16.

Element 21 of figure 1 is labeled “Phase Diff. Encoder”. The element appears to be a “Phase Diff. Decoder” as stated in claim 14, line 24.

Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Billie Mae Murray

GM

April 7, 2004


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